

Highly Efficient Fiber Lasers for Wireless Power Transmission, Phase I

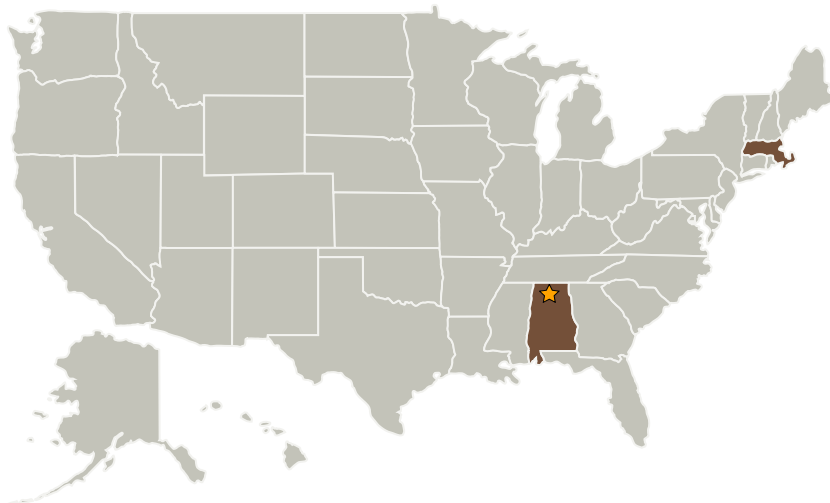
Completed Technology Project (2005 - 2005)



Project Introduction

We propose to develop ytterbium (Yb) fiber lasers with an electrical-to-optical efficiency of nominally 64% by directly coupling 80%-efficient diode lasers with Yb fiber laser structures that are capable of 80% optical-to-optical power conversion. These would be single spatial mode lasers, which are diffraction-limited light sources capable of long-range propagation in a narrow beam. As such they would provide a key technology element for wireless power transmission systems that are based on photovoltaic receiver technologies. The high efficiency diode lasers that form a key part of the proposed light source are currently being developed with DARPA funding under the Super High Efficiency Diode Sources (SHEDS) program. Yb fiber lasers have received a great deal of development effort in the broader laser community and have produced both the highest efficiencies and the highest output powers seen to date from fiber lasers. The innovation provided by this project would be the development of a simple, robust and highly efficient means of coupling the specific SHEDS diode structures to Yb fiber lasers by using laser micromachining to form an integral mirror and Brewster input port on the Yb fiber.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center
(MSFC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Physical Sciences, Inc.	Supporting Organization	Industry	Andover, Massachusetts

Primary U.S. Work Locations

Alabama	Massachusetts
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Glen A Rines

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers